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(54) SYSTEM AND METHOD FOR ADAPTING PRESENTATION ATTRIBUTE FOR A MOBILE COMMUNICATION DEVICE

VORRICHTUNG UND VERFAHREN ZUM ANPASSEN EINES DARSTELLUNGSATTRIBUTES IN EINEM MOBILEN KOMMUNKATIONSGERÄTES

SYSTÈME ET PROCÉDÉ POUR L'ADAPTATION D'UN ATTRIBUTE DE PRÉSENTATION DANS UN DISPOSITIF DE COMMUNICATION MOBILE

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Description

TECHNICAL FIELD

[0001] Embodiments of the subject matter described herein relate generally to output communication for an electronic device. More particularly, embodiments of the subject matter relate to techniques and technology for dynamically magnifying output for a mobile communication device.

BACKGROUND

[0002] Users of a mobile communication device do not remain static when operating the mobile communication device (hereinafter referred to as "the device"). Their orientation and distance relative to the device may change and the environment (for example indoors versus outdoors, time of day, device context) may change during operation of the device. Accordingly, the output of the device whether it is visual content on a display screen or audio content emanating from the device's speakers or microphone levels and filtering can be compromised (that is it becomes more difficult to see visual output or understand audio output or communicate audio into the device) based on a user's relative distance to the device, or background environment, for example.

[0003] The prior art is somewhat limited in that it does not include or contemplate effective and user-friendly techniques to adaptively maintain a user's audio and visual interface preference with her device.

[0004] US patent application publication no. US 2009/209293 describes a speakerphone system integrated in a mobile device which is automatically controlled based on the current state of the mobile device. In one implementation, the mobile device is controlled based on an orientation or position of the mobile device. In another implementation, the control of the speakerphone includes automatically controlling one or more graphical user interfaces associated with the speakerphone system.

[0005] US patent application publication no. US 2005/063556 describes an audio device having a primary audio purpose of producing a programmed audio output for
a listener. The audio device comprises sound-generating components that generate the programmed audio output, and these components include an emitter that audibly emits this programmed output at a playing volume. A proximity sensor senses the distance to the listener, and this sensed distance corresponds to the distance between the listener and the emitter. Volume-adjusting components adjust the playing volume to prevent it from being at an unacceptable level for the sensed distance.

[0006] Japanese patent publication no. 05183621 describes a telephone set in which the function of a receiver and a transmitter is controlled in response to the talking state with simple configuration by measuring a distance between the transmitter and/or the receiver and a human body with a distance sensor and controlling the sound volume of the receiver or the input sensitivity of the transmitter in response to the result of measurement with a sound volume controller and/or an input sensitivity controller.

[0007] PCT patent application publication no. WO 03/026258 describes a mobile radio device that comprises a microphone and a loudspeaker. The loudspeaker is adapted for sound reproduction in the hands-free mode and/or for call signaling. The device is provided with means for acoustically measuring the distance between the loudspeaker and an obstacle and the distance is measured by measuring the propagation time of the test sound. The call signal volume or hands-free volume is controlled in accordance with the propagation time measured. In another embodiment, the output volume on the loudspeaker is controlled in accordance with the measured volume of the reflected test sound.

SUMMARY

[0008] In accordance with the present invention, there is provided a system for adapting magnification of an attribute for a mobile communication device as recited in the accompanying claims.

BRIEF DESCRIPTION OF THE DRAWINGS

[0009] A more complete understanding of the subject matter may be derived by referring to the detailed description and claims when considered in conjunction with the following figures, wherein like reference numbers refer to similar elements throughout the figures.

FIG. 1 is a block diagram of an exemplary embodiment of a system having one or more controllers to provide dynamic user preferred audio and visual content;

FIG. 2 is a flow chart that illustrates an exemplary embodiment of an initializing process;

FIG. 3 is a flow chart that illustrates an exemplary embodiment of an active visual set mode process; have problem with figure 3

FIG. 4 is a flow chart that illustrates an exemplary embodiment of an active audio set mode process

FIG. 5 is a flow chart that illustrates an exemplary embodiment of an active text set mode process; and

FIG. 6 is a flow chart that illustrates an exemplary embodiment of a phone context tracking mode process.

FIG. 7 is an exemplary illustration of a method to setting user-preferred magnification;

FIG. 8 is an exemplary illustration of method to setting user-preferred magnification while device is being moved in an opposite direction from FIG. 7;

FIG. 9 is an exemplary illustration of a method for tracking user-preferred magnification in accordance

with figure to maintain user preferred setting;

FIG. 10 is an exemplary illustration of a method for tracking user-preferred magnification while device is being moved in a opposite direction from FIG. 9;

FIG. 11 is an exemplary illustration of a method for setting user-preferred reduction one;

FIG. 12 is an exemplary illustration of a method for setting user-preferred reduction in another direction;

FIG. 13 is an exemplary illustration of a method for tracking user-preferred reduction in one direction; and

FIG. 14 is an exemplary illustration of a method for tracking user-preferred reduction in another direction.

DETAILED DESCRIPTION

[0010] User initiates request to enable a user-preferred readability and audibility interface mode with device. There are at least three types of controls for example, visual, audio (speaker and microphone) and text formats. Three phases are disclosed herein: initiating, setting, and tracking phases. The visual content magnification and audible level setting and tracking phases behave opposite to one another to counter device-user subsequent relative spacing changes following the setting phase, thus maintaining preferred user set interface. The text format and audio spectral selections are previously set and stored in device (different profiles can be stored by a factory) and are selected during the tracking phase based on sensor outputs at the time. In other words, the visual setting is driven by device user-relative positions (spacing and orientation).

[0011] The audio level setting can also be driven by device-user relative positions (e.g., spacing and orientations). The audio equalization and spectral changes are selected from a group of profiles stored in a phone, for example, for various user/device spacing, device context and environment conditions. In this vein, audio filtering can be done by assessing an output from a sensor and change spectral content of the audio, such as increased bass or treble, increased low or high frequency content for user-preferred audio intelligibility within a noisy environment. An imager can detect the presence of a hearing aid, thereby a controller adaptively changes the acoustic content according to a stored audio profile within the mobile communication device, wherein the audio profile includes volume level, audio spectrum, audio filtering, and audio directional steering.

[0012] The text formats are selected from a group of profiles stored in a phone (during factory setting) for various user/device spacing, device context and environment conditions. During the tracking phase, and based on changing sensor outputs, a best match with stored profiles is determined and selected for use. If sensor outputs and device context continue to change during tracking, other profiles are selected in an adaptive way accordingly. At the end of the call or device session, a device can go back to normal default mode. User can also manually select from various stored profiles irrespective of sensor readings and live detections. In the case an imager is used for determining eye gaze direction, i.e., a user's looking direction relative to the device is assessed and if determined that the user is averting her gaze from the display, the display is turned off for privacy and power saving. An imager can also be used to detect the presence of prescription glasses and or hearing aids (when user is looking away from the device the camera may have a view of a hearing aid) and use that to adjust best interface profiles accordingly. For example, an output from the imager may cause a controller to mute a microphone of a mobile communication device. An imager can also be combined with a range estimator.

[0013] During the setting phase, user can set one type (i.e. visual) or cycle through various controls to set other types (i.e. audio, text).

[0014] The initiating of the best interface mode is done with a button press, sensor detect, voice or gesturing on device or with device. The selection of setting preference is done via voice command, holding device motionless for a period of time, gesturing in front of device's display or with the device itself, blinking an eye (image recognition), gesturing with head or other handsfree gestures, tapping phone, etc.

[0015] The following detailed description is merely illustrative in nature and is not intended to limit the embodiments of the subject matter or the application and uses of such embodiments. As used herein, the word "exemplary" means "serving as an example, instance, or illustration." Any implementation described herein as exemplary is not necessarily to be construed as preferred or advantageous over other implementations. Furthermore, there is no intention to be bound by any expressed or implied theory presented in the preceding technical field, background, brief summary or the following detailed description.

[0016] Techniques and technologies may be described herein in terms of functional and/or logical block components and with reference to symbolic representations of operations, processing tasks, and functions that may be performed by various computing components or devices. Such operations, tasks, and functions are sometimes referred to as being computer-executed, computerized, software-implemented, or computer-implemented. In practice, one or more processor devices can carry out the described operations, tasks, and functions, and the various block components shown in the figures may be realized by any number of hardware, software, and/or firmware components configured to perform the specified functions. For example, an embodiment of a system or a component may employ various integrated circuit components, e.g., memory elements, digital signal processing elements, logic elements, look-up tables, or the like, which may carry out a variety of functions under the control of one or more microprocessors or other control devices.

[0017] For the sake of brevity, conventional techniques related to signal processing, data transmission, signaling, network control, and other functional aspects of the systems (and the individual operating components of the systems) may not be described in detail herein. Furthermore, the connecting lines shown in the various figures contained herein are intended to represent exemplary functional relationships and/or physical couplings between the various elements. It should be noted that many alternative or additional functional relationships or physical connections may be present in an embodiment of the subject matter.

[0018] Referring now to the drawings, FIG. 1 is a block diagram of an exemplary embodiment of a system 100 having a user initialization controller 102. The user initialization controller 102 is suitably configured to communicate and perform data transfer with a processor 104. Processor 104 can also be communicatively coupled to a visual controller 106, a text effects controller 108, and an audio controller 110, wherein the audio controller 110 affects audio volume level, audio equalization, audio filtering, and audio directional steering. In addition, processor 104 is also coupled to one or more sensors 112, for example accelerometers, GPS, sensors (e.g., capacitive touch, proximity), and hardware sensors such as infrared and ultrasonic sensors. A memory 114 can also be communicatively coupled to processor 104 for storing user preferences for output of visual and audio content and user profiles.

[0019] It should be appreciated that a described process may include any number of additional or alternative tasks, the tasks shown in the figures need not be performed in the illustrated order, and a described process may be incorporated into a more comprehensive procedure or process having additional functionality not described in detail herein. Moreover, one or more of the tasks shown in a figure could be omitted from an embodiment of the respective process as long as the intended overall functionality remains intact.

[0020] An attribute as defined herein means either an audio or visual effect.

[0021] Magnification as defined herein can be considered as enlargement or intensification of either an audio or visual attribute. Reduction is the opposite of magnification and is defined herein as shrinking or lessening of an audio or visual attribute.

[0022] A first sensor or set of sensors as used herein assesses the user and the device's relative position, orientation, and angle.

[0023] A second sensor or set of sensors as used herein detect the device context and operating mode, tilt, environment, time of day, prior use, speed, elevation, humidity, visible light, sunlight, and other weather-related conditions.

[0024] In this regard, FIG. 2 is a flow chart that illustrates an exemplary embodiment of a processor or network server operating process 200. The process 200 may be performed by a network server or processor 104 (as described earlier in Fig. 1). A user can initiate the calibration mode in task 202. The user may press a button, or activate a touchscreen, issue a voice command, perform a gesture on or near the device, perform a gesture with device, or activate a sensor to cause initiation and indicate that device is in such a mode. The process 200 may cycle independent set modes, visual, audible, and text format in task 204. In task 206 the user selects one or more of the independent set modes that were previously cycled. Thereafter, the selected set mode is activated via task 208. The process 200 continues wherein the user receives an indication of the selected set mode in task 210. An inquiry by the processor in task 212 determines which set mode has been selected. Depending on the selected set mode, one or more functionalities are driven by the processor, (task 214) For example, a graphics interface may be driven to project images, text, and numbers to the user.

[0025] Task 216 enables a user to calibrate device by varying her arm-length distance or orientating her head, relative to the display screen, in a different manner. The preferred distance can be set by dwelling or holding at a distance for a specific time period, activating a voice command, or other input control methods. The preferable user setting is stored in task 218 of the process 200.

[0026] Referring to FIG. 3, the process 300 may be performed by a network server or processor 104 (as described earlier in Fig. 1). In this regard, the process 300 activates the visual set mode. In certain embodiments, the process 300 cycles independent set modes for selection in task 302.

[0027] The process 300 continues by activating the selected set mode from above in task 304. A graphics interface is driven by the processor in task 306. The graphics interface can be used to project images, text, and numbers to the user as a graphical interface.

[0028] An inquiry is made by task 308 on whether to continue to another setting mode, for example, audio or text. If the user desires to start another setting mode, task 310 cycles the next selected set mode for the user, and continues back to task 306. Otherwise, the setting modes are ended in task 312; whereupon task 314 begins the tracking mode.

[0029] Audio level can be set similarly as the font size magnification was set and described above. A user can hear a tone from the device and uses the tone while moving the device either further or closer to determine the preferred level of audibility. The audio level setting phases are similar to the font size setting phases which include a setting phase and tracking phase based on the ability of the user to move the device. Once the user preferred audio level is set, the device operational modes and sensors are used to select one of many stored audio profiles for optimum audio spectral content and filtering techniques to improve audio intelligibility within the current environment that the device is used in.

[0030] FIG. 4 is a flow chart that illustrates an exemplary embodiment of activating the audio set mode with

process 400. The process 400 may begin by communicating an indication to the user of the audio set mode being available in task 402. The processor 104 drives an audio driver or controller to output audio (such as tone, speech, music, spectral content) in task 404. The audio controller affects audio volume level, audio equalization, audio filtering, and audio directional steering. Audio output of the mobile communication device can be altered based on the context of the mobile communication device, said audio output alteration can include adaptive acoustical spectrum change in contrast to an environmental presence of the mobile communication device.

[0031] The audio controller or driver can operate in one or more predefined time windows. Sampling of sensors is performed by task 406.

[0032] Task 408 selects one or more stored spectral profiles. Near the end of the process 400, task 410 inquires whether to proceed to the next setting mode. If affirmative, task 412 cycles to the next selected set mode. Otherwise, the setting mode ends and the tracking mode begins (not shown in Fig. 4).

[0033] FIG. 5 is a flow chart that illustrates an exemplary embodiment of activating the text set mode with process 500. The illustrated embodiment of the process 500 begins with task 502 communicating an indication, for receipt by the user, of the text set mode being available. Task 504 samples information from context sensors for device background conditions and environmental conditions, such as lighting. In addition, task 504 samples sensors of the device that may include darkness, sunlight, time of day, location, orientation, movement, speed, and device use mode, for example.

[0034] Operational modes and device orientation are assessed by task 506. Processor 104 may use input from sensors such as infrared (IR), imagers, ultrasound, touch, accelerometer, elevation, speed, and other sensors useful to determine device operational mode and device context. That determination is used to set certain text formats based on previously stored models and profiles in device for a variety of operation and context modes. Upon assessing the operational modes, stored text formats can be applied in task 508. Text formats can include color, backlight color, dynamically improving background to text contrast, 3D effects, holding, capitalizing, embossing, engraving, font type, and font size, for example. The aforementioned list of text formats is not exhaustive, but is illustrative. In addition, text formats can also include 3D depth-effects, shadowing, underlining, italicizing, capitalization, text color, text color relative to display backlight color, text color relative to external background, display backlight color relative to external background, text spacing, font type, and text sizing.

[0035] An indication of the end of the setting mode is performed by task 510. Task 512 begins the user preferred tracking mode.

[0036] Upon the start of the tracking mode, the device context changes. In this regard, Fig. 6 illustrates an exemplary process 600 of the context changing for a device during the tracking mode, such as a mobile communication device (i.e., phone, tablet, PDA). Task 602 uses processor 104 to drive one or more of the following components: a graphical interface, an audio driver, or a graphical accelerator to counter device changes subsequent to the setting mode. These driven components will enable the device to maintain the user preferred visual, audio, and text interface selected during the setting mode. For example, during the tracking mode, as the device moves away from a preestablished reference point, the volume may increase and there may be magnification (or demagnification) of fonts, images, and texts which will cause a change in the opposite direction from the setting mode.

[0037] Task 604 ends the session, whereupon task 606 inquires whether the device should default to "normal" settings, i.e., settings that do not include the user's preferences as determined during the setting mode. If affirmative, task 608 ends session. Otherwise, task 610 stores the settings and provides an opportunity for the user to select the stored profile in task 612. These stored profiles can thereafter be used to drive the graphical interface, audio driver, and graphical accelerator. The user can have many stored profiles based on location, time of day, environments, vision that may or may not include glasses and audio that may or may not include hearing aid devices. Thus, when the user is in the same environment she is able to pick from previously stored profiles that are applicable to her preferences. The stored profiles best matching the device context and/or operational modes are also ranked and made more readily available when the device is detected to be in a matching or similar environment, for example a beach or a museum; wherein a beach profile has been previously stored in the device. Alternatively, a device's prior use history can be stored and recalled as well.

[0038] Referring to FIG. 7 an exemplary method of setting a user-preferred magnification is shown. Hereinafter, the terms "setting phase" and "tracking phase" are used interchangeably with "setting mode" and "tracking mode". When the user 700 moves the device 702 closer to her head or when the device-to-user distance decreases, the magnification 704 on a display of the device 702 (or in some cases the character font size) increases. This movement 706 can be thought of as emulating the natural phenomena of moving a paper with writing on it closer to one's eye to see the writing more clearly, because the letters appear larger. Moreover, the starting point for the user to begin moving the device closer to set the magnification preference is arbitrary. That is to set a displayed font size, the user begins moving the device closer from the arbitrary point in space. Alternatively, the setting phase described above could be reversed from the natural or inherent movement. An example, in the setting phase the user would move the device closer to reduce the font or move the device further away to increase the font.

[0039] Referring to FIG. 8, another exemplary method of setting a user-preferred magnification is shown. FIG.

8 is the setting phase in the opposite direction of what is shown in FIG. 7. Font size changes can be limited within a predetermined range during the movement so that the user has a more manageable control of the magnification. For example, a maximum range of font size change can be within sizes 8-14 as the user-device distance varies. FIG. 8 includes a user 800 with a device display 802 having a set of dynamically changing characters 804 based on movement 806.

[0040] Referring to FIGs. 9 and 10, an exemplary illustration of a method for tracking user-preferred magnification is shown. During the tracking phase the device compensates for the changing distance between the user and the device, therefore, the tracking phase acts opposite from the setting phase. Specifically, if the setting phase increases magnification based on device directional movement, the tracking phase decreases magnification and vise versa.

[0041] In FIG. 9, for example, having completed the setting phase, the device switches to the tracking phase, where the magnification is reduced as the device is brought closer to the user. FIG. 9 includes a user 900 with a device display 902 having a set of dynamically changing characters 904 based on movement 906.

[0042] In FIG. 10, for example, having completed the setting phase, the device switches to the tracking phase, where the magnification is increased as the device is moved away from the user. FIG. 10 includes a user 1000 with a device display 1002 having a set of dynamically changing characters 1004 based on movement 1006.

[0043] Notably, the tracking phase in Figs 9 &10 could reverse direction, if the setting phase shown in Figs. 7 & 8 also shows reduction of a character font size, for example.

[0044] Reduction of a larger character font is shown for another example of a setting phase in FIG. 11. FIG. 11 includes a user 1100 with a device display 1102 having a set of dynamically changing characters 1104 based on movement 1106.

[0045] Reduction of a larger character font is shown for a setting phase in an opposite direction is shown in FIG. 12. FIG. 12 includes a user 1200 with a device display 1202 having a set of dynamically changing characters 1204 based on movement 1206.

[0046] As a result, Figs. 13 & 14 show corresponding tracking phases in relation to FIGs. 11 & 12, respectively. FIG. 13 includes a user 1300 with a device display 1302 having a set of dynamically changing characters 1304 based on movement 1306. Likewise, FIG. 14 includes a user 1400 with a device display 1402 having a set of dynamically changing characters 1404 based on movement 1406.

[0047] A user may navigate through visual, audio, and text format changes to affect her preferences for her device. A user may or may not employ the visual, audio, or text format setting and tracking phases at one time. The user can be prompted to navigate from one setting phase to another, for example, from visual to audio to text formats. However, the order of navigation is not fixed and can be selectively changed by the user.

[0048] While at least one exemplary embodiment has been presented in the foregoing detailed description, it should be appreciated that a vast number of variations exist. For example, the dynamically changed characters in Figs. 7-14 can be text or symbolic icons that may indicate audio levels. It should also be appreciated that the exemplary embodiment or embodiments described herein are not intended to limit the scope, applicability, or configuration of the claimed subject matter in any way. Rather, the foregoing detailed description will provide those skilled in the art with a convenient road map for implementing the described embodiment or embodiments. It should be understood that various changes can be made in the function and arrangement of elements without departing from the scope defined by the claims, which includes known equivalents and foreseeable equivalents at the time of filing this patent application.

Claims

1. A system (100) for adapting magnification of an attribute for a mobile communication device, comprising:

an output device (106, 108 or 110) for the attribute, the output device being connected to the mobile communication device;
a first sensor (112) for tracking distance of at least a part of a user's head relative to the mobile communication device; and
a controller (102) adapted to:

initiate a setting mode for magnification change;
in the setting mode, change a magnitude of the attribute and set the magnitude of the attribute to a user-preferred magnitude based on movement of the mobile communication device relative to the user's head; and
after completing the setting mode, initiate a tracking mode for dynamically adjusting the magnitude of the attribute relative to the user-preferred magnitude provided in the setting mode and based on a change in the distance of at least the part of the user's head relative to the mobile communication device,

wherein in the setting mode the magnitude of the attribute is increased based on movement of the mobile communication device in a first direction, and in the tracking mode the magnitude is decreased based on movement of the mobile communication device in the first direction, or

wherein in the setting mode the magnitude of the attribute is decreased based on movement of the mobile communication device in a first direction, and in the tracking mode the magnitude is increased based on movement of the mobile communication device in the first direction.

2. The system claimed in claim 1, wherein the attribute includes at least an audio portion, and wherein the output device is a speaker controlled by the mobile communication device.

3. The system claimed in claim 1, wherein the attribute includes at least a visual portion, and wherein the output device is a display controlled by the mobile communication device.

4. The system claimed in claim 3, wherein the attribute is a character size presented on the display.

5. The system claimed in claim 1, wherein the first sensor (112) is a proximity detector capable of detecting at least one dimension in physical space.

6. The system claimed in claim 1, wherein the first sensor (112) is at least an imager.

7. The system claimed in claim 6, wherein the first sensor (112) is a combination of the imager and at least one range estimator capable of detecting at least one dimension in physical space, wherein the range estimator is selected from a group of infrared and ultrasound.

8. The system claimed in claim 6, wherein the imager is adapted to detect a presence of hearing aids and a user's focused eye gaze or looking direction relative to the mobile communication device.

9. The system claimed in claim 8, wherein upon detection by the imager of an averted eye gaze, the controller is adapted to mute a microphone of the mobile communication device.

10. The system claimed in claim 8, wherein upon detection by the imager of the presence of the hearing aid, the controller is adapted to adaptively change acoustic content according to a stored audio profile within the mobile communication device, wherein the audio profile includes volume level, audio spectrum, audio filtering, and audio directional steering.

11. The system claimed in claim 1, wherein the controller is adapted to receive an input to initialize the setting mode.

12. The system claimed in claim 11, wherein the setting mode includes sensing relative location of the user's head relative to the mobile communication device.

13. The system claimed in claim 12, wherein the relative location of the user's head to the mobile communication device encompasses the distance and an angular position relative to a normal position relative to the mobile communication device.

14. The system claimed in claim 1, wherein the controller is adapted to receive an input that finalizes the setting mode and initiates the tracking mode.

15. The system claimed in claim 14, wherein the input for initiating the tracking mode includes, from the mobile communication device, an accelerometer signal, a manual selection, a handsfree gesture, a device gesture, and/or a voice command.

16. The system claimed in claim 15, wherein the accelerometer signal of the mobile communication device is coupled with a predetermined time period for switching from the setting mode to the tracking mode.

17. The system claimed in claim 1, wherein the controller is further adapted to affect content presentation on the display based on a second sensor determining a context of the mobile communication device, the context comprising an orientation of the mobile communication device, an operation of the communication device, a movement of the mobile communication device, an environmental condition in which the mobile communication device is operating, a device use prior history, and a relative location of the user's head relative to the mobile communication device.

18. The system claimed in claim 17 wherein text formats are dynamically changed depending on an output of the first sensor of the mobile communication device, the text formats selected from a group consisting of: 3D depth-effects, embossing, bolding, shadowing, underlining, italicizing, capitalization, text color, text color relative to display backlight color, text color relative to external background, display backlight color relative to external background, text spacing, font type, and text sizing

19. The system claimed in claim 1, wherein the attribute includes at least an audio portion received at an input device and wherein the input device is a microphone at least partially controlled by the mobile communication device.

20. The system claimed in claim 2, further comprising at least a second sensor (112) adapted to determine a context of the mobile communication device, the context comprising an external environment, a movement, an orientation, a location, an altitude, an

operational mode, a user-to-device relative position that includes a distance and an angle, and wherein the controller is adapted to affect an audio volume level, an audio equalization, an audio filtering, and an audio directional steering, and wherein the audio portion is determined based at least in part on the context of the mobile communication device.

Patentansprüche

1. System (100) zum Anpassen der Größenordnung eines Attributes für ein mobiles Kommunikationsgerät, umfassend:

ein Ausgabegerät (106, 108 oder 110) für das Attribut, wobei das Ausgabegerät mit dem mobilen Kommunikationsgerät verbunden ist;
einen ersten Sensor (112) für das Verfolgen des Abstands zumindest eines Teils des Kopfes eines Benutzers in Bezug auf das mobile Kommunikationsgerät; und
einen Controller (102), der angepasst ist:

einen Einstellungsmodus für eine Änderung der Größenordnung zu initiieren;
im Einstellungsmodus, eine Größenordnung des Attributes zu ändern und die Vergrößerung des Attributes auf eine vom Benutzer bevorzugte Größenordnung basierend auf der Bewegung des mobilen Kommunikationsgerätes in Bezug auf den Kopf des Benutzer einzustellen; und
nach Abschließen des Einstellungsmodus, einen Verfolgungsmodus für das dynamische Anpassen der Größenordnung des Attributes in Bezug auf die vom Benutzer bevorzugte Größenordnung zu initiieren, die in dem Einstellungsmodus angegeben ist, und basierend auf einer Veränderung bei dem Abstand zumindest des Teils des Kopfes des Benutzers in Bezug auf das mobile Kommunikationsgerät,

wobei im Einstellungsmodus die Größenordnung des Attributes basierend auf der Bewegung des mobilen Kommunikationsgerätes in eine erste Richtung vergrößert wird, und in dem Verfolgungsmodus die Größenordnung basierend auf der Bewegung des mobilen Kommunikationsgerätes in die erste Richtung verringert wird, oder
wobei im Einstellungsmodus die Größenordnung des Attributes basierend auf der Bewegung des mobilen Kommunikationsgerätes in eine erste Richtung verringert wird, und in dem Verfolgungsmodus die Größenordnung basierend auf der Bewegung des mobilen Kommunikationsgerätes in die erste Richtung vergrößert wird.

2. System nach Anspruch 1, wobei das Attribut mindestens einen Audioteil beinhaltet, und wobei das Ausgabegerät ein Lautsprecher ist, der durch das mobile Kommunikationsgerät gesteuert wird.

3. System nach Anspruch 1, wobei das Attribut mindestens einen visuellen Teil beinhaltet, und wobei das Ausgabegerät eine Anzeige ist, die durch das mobile Kommunikationsgerät gesteuert wird.

4. System nach Anspruch 3, wobei das Attribut eine Zeichengröße ist, die auf der Anzeige dargestellt wird.

5. System nach Anspruch 1, wobei der erste Sensor (112) ein Näherungsdetektor ist, der in der Lage ist, mindestens eine Dimension im physischen Raum zu erkennen.

6. System nach Anspruch 1, wobei der erste Sensor (112) zumindest ein Bildgeber ist.

7. System nach Anspruch 6, wobei der erste Sensor (112) eine Kombination des Bildgebers und mindestens eines Bereichsschätzers ist, der in der Lage ist, mindestens eine Dimension im physischen Raum zu erkennen, wobei der Bereichsschätzer aus einer Gruppe von Infrarot und Ultraschall ausgewählt wird.

8. System nach Anspruch 6, wobei der Bildgeber angepasst ist, um ein Vorhandensein von Hörhilfen und den fokussierten Blick eines Benutzers oder die Blickrichtung in Bezug auf das mobile Kommunikationsgerät zu erkennen.

9. System nach Anspruch 8, wobei der Controller angepasst ist, nach Erkennen eines abgewendeten Blicks durch den Bildgeber, ein Mikrofon des mobilen Kommunikationsgeräts stummzuschalten.

10. System nach Anspruch 8, wobei der Controller angepasst ist, nach Erkennen des Vorhandenseins der Hörhilfe durch den Bildgeber, Akustikinhalt gemäß einem gespeicherten Audioprofil innerhalb des mobilen Kommunikationsgerätes adaptiv zu ändern, wobei das Audioprofil Lautstärke, Audiospektrum, Audiofilterung und gerichtete Audiolenkung beinhaltet.

11. System nach Anspruch 1, wobei der Controller angepasst ist, eine Eingabe zu empfangen, um den Einstellungsmodus zu initialisieren.

12. System nach Anspruch 11, wobei der Einstellungsmodus das Erfassen der relativen Position des Kop-

fes des Benutzers in Bezug auf das mobile Kommunikationsgerät beinhaltet.

13. System nach Anspruch 12, wobei die relative Position des Kopfes des Benutzers des mobilen Kommunikationsgerätes den Abstand und eine Winkelposition in Bezug auf eine normale Position in Bezug auf das mobile Kommunikationsgerät umfasst.

14. System nach Anspruch 1, wobei der Controller angepasst ist, eine Eingabe zu empfangen, die den Einstellungsmodus beendet und den Verfolgungsmodus initiiert.

15. System nach Anspruch 14, wobei die Eingabe für das Initiieren des Verfolgungsmodus ein Beschleunigungssensorsignal, eine manuelle Auswahl, eine Freihand-Geste, eine Gerätegeste und/oder einen Sprachbefehl von dem mobilen Kommunikationsgerät beinhaltet.

16. System nach Anspruch 15, wobei das Beschleunigungssensorsignal des mobilen Kommunikationsgerätes mit einem vorher festgelegten Zeitraum für das Umschalten vom Einstellungsmodus in den Verfolgungsmodus gekoppelt ist.

17. System nach Anspruch 1, wobei der Controller ferner angepasst ist, um die Inhaltspräsentation auf der Anzeige basierend auf einem zweiten Sensor zu beeinflussen, der einen Kontext des mobilen Kommunikationsgerätes ermittelt, wobei der Kontext eine Ausrichtung des mobilen Kommunikationsgerätes, eine Bedienung des Kommunikationsgerätes, eine Bewegung des Kommunikationsgerätes, eine Umgebungsbedingung, in der das mobile Kommunikationsgerät betrieben wird, eine Vorgeschichte der Gerätenutzung und eine relative Position des Kopfes des Benutzers in Bezug auf das mobile Kommunikationsgerät umfasst.

18. System nach Anspruch 17, wobei Textformate je nach einer Ausgabe des ersten Sensors des mobilen Kommunikationsgerätes dynamisch geändert werden, wobei die Textformate aus einer Gruppe ausgewählt werden, die aus Folgendem besteht: 3D-Tiefeneffekte, Prägung, Fettschrift, Schattierung, Unterstreichung, Kursivschrift, Großschreibung, Textfarbe, Textfarbe in Bezug auf die Hintergrundfarbe der Anzeige, Textfarbe in Bezug auf externen Hintergrund, Hintergrundfarbe der Anzeige in Bezug auf externen Hintergrund, Textabstand, Schriftart und Textgröße

19. System nach Anspruch 1, wobei das Attribut mindestens einen Audioteil beinhaltet, der an einem Eingabegerät empfangen wird, und wobei das Eingabegerät ein Mikrofon ist, das zumindest teilweise durch das mobile Kommunikationsgerät gesteuert wird.

20. System nach Anspruch 2, ferner umfassend mindestens einen zweiten Sensor (112), der angepasst ist, einen Kontext des mobilen Kommunikationsgerätes zu ermitteln, wobei der Kontext eine externe Umgebung, eine Bewegung, eine Ausrichtung, eine Position, eine Höhe, einen Betriebsmodus, eine relative Position vom Benutzer zum Gerät, die eine Entfernung und einen Winkel beinhaltet, umfasst, und wobei der Controller angepasst ist, um eine Audiolautstärke, eine Audioentzerrung, eine Audiofilterung und eine gerichtete Audiolenkung zu beeinflussen, und wobei der Audioteil zumindest teilweise basierend auf dem Kontext des mobilen Kommunikationsgerätes ermittelt wird.

Revendications

1. Système (100) pour l'adaptation de l'amplification d'un attribut pour un dispositif de communication mobile, comprenant :

un dispositif de sortie (106, 108 ou 110) pour l'attribut, le dispositif de sortie étant connecté au dispositif de communication mobile ;
un premier capteur (112) pour le suivi de la distance d'au moins une partie d'une tête d'utilisateur au dispositif de communication mobile ; et
un contrôleur (102) adapté pour :

l'initialisation d'un mode de réglage pour un changement d'amplification ;
dans le mode de réglage, le changement d'une amplitude de l'attribut et le réglage de l'amplitude de l'attribut à une amplitude préférée par l'utilisateur sur la base de mouvement du dispositif de communication mobile par rapport à la tête de l'utilisateur ; et
une fois terminé le mode de réglage, l'initialisation d'un mode de suivi pour l'ajustement dynamique de l'amplitude de l'attribut par rapport à l'amplitude préférée par l'utilisateur fournie dans le mode de réglage et basée sur le changement de la distance d'au moins une partie de la tête de l'utilisateur par rapport au dispositif de communication mobile,

où dans le mode de réglage l'amplitude de l'attribut est augmentée sur la base du mouvement du dispositif de communication mobile dans une première direction, et dans le mode de suivi l'amplitude est réduite sur la base du mouvement du dispositif de communication mobile dans la première direction, ou

où dans le mode de réglage l'amplitude de l'attribut est réduite sur la base du mouvement du dispositif de communication mobile dans une première direction, et dans le mode de suivi l'amplitude est augmentée sur la base du mouvement du dispositif de communication mobile dans la première direction.

2. Système selon la revendication 1, dans lequel l'attribut inclut au moins une partie audio, et dans lequel le dispositif de sortie est un haut-parleur contrôlé par le dispositif de communication mobile.

3. Système selon la revendication 1, dans lequel l'attribut inclut au moins une partie visuelle, et dans lequel le dispositif de sortie est un écran contrôlé par le dispositif de communication mobile.

4. Système selon la revendication 3, dans lequel l'attribut est une taille de caractère présentée sur l'écran.

5. Système selon la revendication 1, dans lequel le premier capteur (112) est un capteur de proximité susceptible de détecter au moins une dimension dans un espace physique.

6. Système selon la revendication 1, dans lequel le premier capteur (112) est au moins un imageur.

7. Système selon la revendication 6, dans lequel le premier capteur (112) est une combinaison d'un imageur et d'au moins un estimateur de portée susceptible de de détecter au moins une dimension dans un espace physique, où l'estimateur de portée est choisi dans un groupe d'infrarouge et d'ultrason.

8. Système selon la revendication 6, dans lequel l'imageur est adapté pour détecter la présence de prothèses auditives et le regard fixé ou une direction de regard de l'utilisateur par rapport au dispositif de communication mobile.

9. Système selon la revendication 8, dans lequel lors de la détection par l'imageur d'un regard détourné, le contrôleur est adapté pour couper le son d'un microphone du dispositif de communication mobile.

10. Système selon la revendication 8, dans lequel lors de la détection par l'imageur de la présence de la prothèse auditive, le contrôleur est adapté pour changer de manière adaptive le contenu acoustique selon un profil audio stocké dans le dispositif de communication mobile, où le profil audio inclut un niveau de volume, un spectre audio, un filtrage audio et un guidage directionnel audio.

11. Système selon la revendication 1, dans lequel le contrôleur est adapté pour recevoir une entrée pour initialiser le mode de réglage.

12. Système selon la revendication 11, dans lequel le mode de réglage inclut la détection d'un emplacement relatif de la tête de l'utilisateur par rapport au dispositif de communication mobile.

13. Système selon la revendication 12, dans lequel l'emplacement relatif de la tête de l'utilisateur par rapport au dispositif de communication mobile englobe la distance et une position angulaire par rapport à une position normale par rapport au dispositif de communication mobile.

14. Système selon la revendication 1, dans lequel le contrôleur est adapté pour recevoir une entrée qui finalise le mode de réglage et initialise le mode de suivi.

15. Système selon la revendication 14, dans lequel l'entrée pour l'initialisation du mode de suivi inclut, venant du dispositif de communication mobile, un signal d'accéléromètre, une sélection manuelle, un geste mains-libres, et/ou une commande vocale.

16. Système selon la revendication 15, dans lequel le signal d'accéléromètre du dispositif de communication mobile est couplé à une période de temps prédéterminée pour commuter du mode de réglage au mode de suivi.

17. Système selon la revendication 1, dans lequel le contrôleur est en outre adapté pour affecter la présentation de contenu sur l'écran sur la base d'un deuxième capteur déterminant un contexte du dispositif de communication mobile, le contexte comprenant une orientation du dispositif de communication mobile, un actionnement du dispositif de communication mobile, un mouvement du dispositif de communication mobile, une condition environnementale dans laquelle fonctionne le dispositif de communication mobile, un historique d'usage de dispositif antérieur, et un emplacement relatif de la tête de l'utilisateur par rapport au dispositif de communication mobile.

18. Système selon la revendication 17, dans lequel des formats de texte sont changés dynamiquement en fonction d'une sortie du premier capteur du dispositif de communication mobile, les formats de texte étant choisis dans un groupe constitué de: effets de profondeur 3D, gaufrage, mise en gras, ombrage, soulignage, mise en italique, capitalisation, couleur de texte, couleur de texte relative à la couleur de rétro-éclairage d'écran, couleur de texte relative à l'arrière-plan externe, couleur de rétro-éclairage d'écran relative à l'arrière-plan externe, espacement du texte, type de police et dimensionnement du texte.

19. Système selon la revendication 1, dans lequel l'attribut inclut au moins une partie audio reçue d'un dispositif de saisie et dans lequel le dispositif de saisie est un microphone au moins partiellement contrôlé par le dispositif de communication mobile.

20. Système selon la revendication 2, comprenant, en outre, au moins un deuxième capteur (112) adapté pour déterminer un contexte du dispositif de communication mobile, le contexte comprenant un environnement externe, un mouvement, une orientation, un emplacement, une altitude, un mode opérationnel, une position relative utilisateur à dispositif qui inclut une distance et un angle, et dans lequel le contrôleur est adapté pour affecter un niveau de volume audio, une égalisation audio, un filtrage audio, et un guidage directionnel audio, et dans lequel la partie audio est déterminée sur la base au moins en partie du contexte du dispositif de communication mobile.

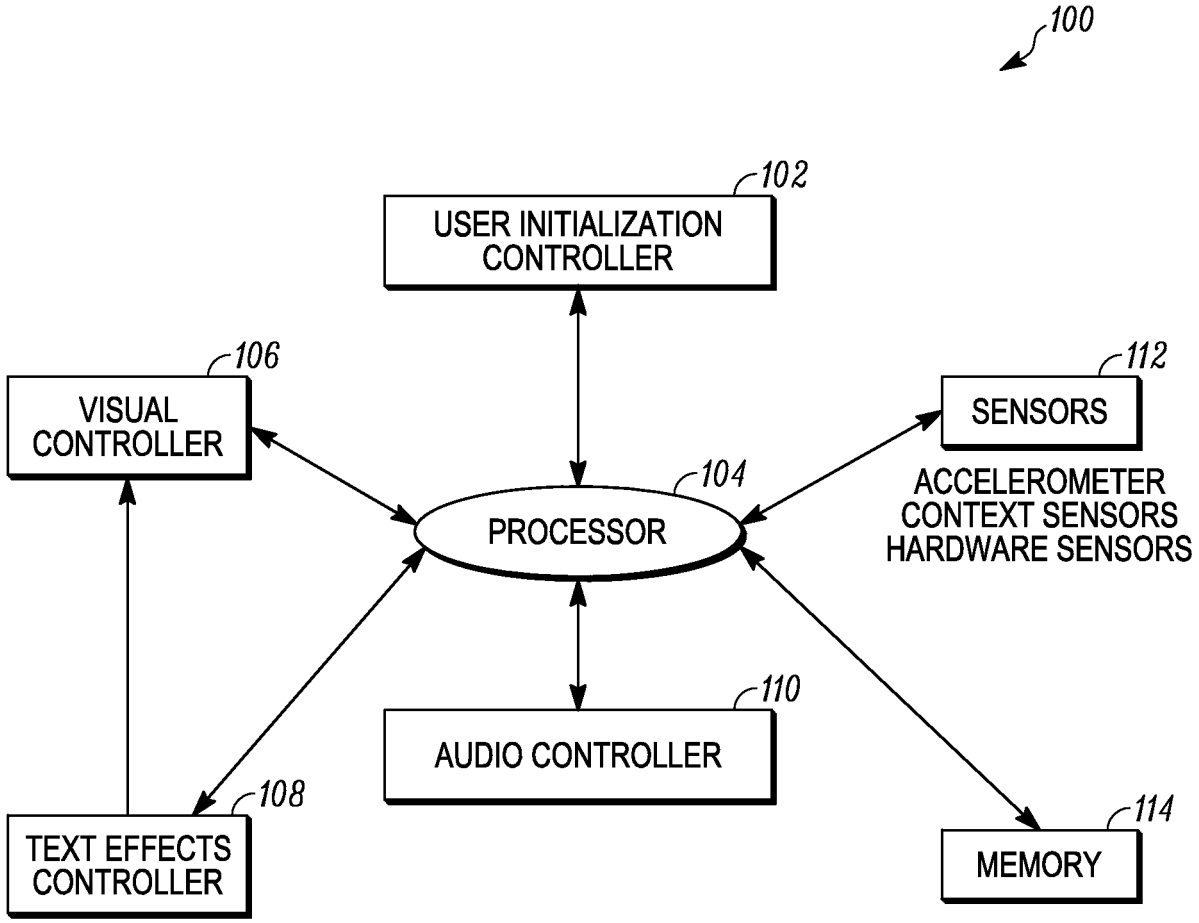

100
102
USER INITIALIZATION CONTROLLER
106
VISUAL CONTROLLER
112
SENSORS
ACCELEROMETER
CONTEXT SENSORS
HARDWARE SENSORS
104
PROCESSOR
110
AUDIO CONTROLLER
108
TEXT EFFECTS CONTROLLER
114
MEMORY

FIG. 1

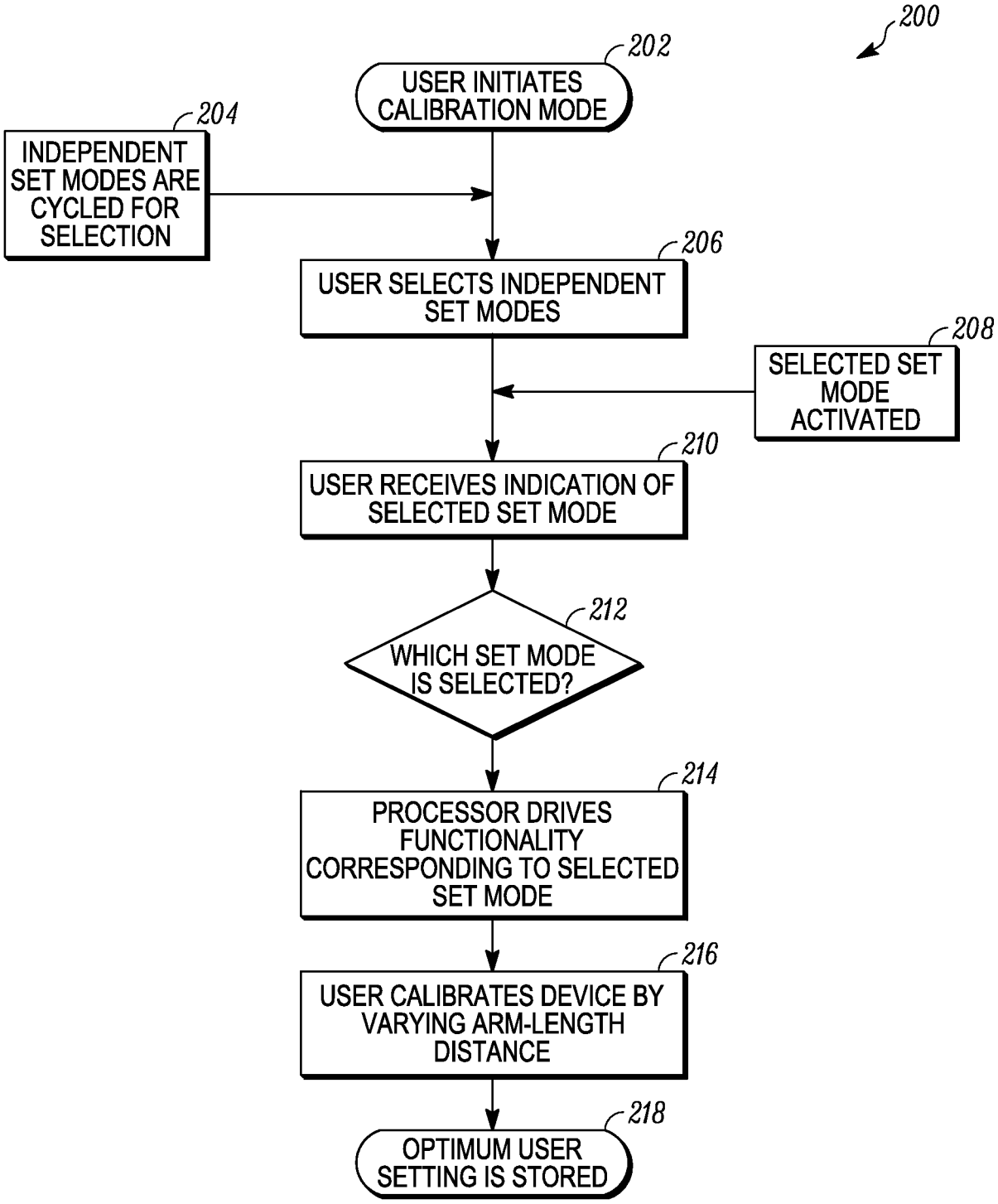

200
202
USER INITIATES CALIBRATION MODE
204
INDEPENDENT SET MODES ARE CYCLED FOR SELECTION
206
USER SELECTS INDEPENDENT SET MODES
208
SELECTED SET MODE ACTIVATED
210
USER RECEIVES INDICATION OF SELECTED SET MODE
212
WHICH SET MODE IS SELECTED?
214
PROCESSOR DRIVES FUNCTIONALITY CORRESPONDING TO SELECTED SET MODE
216
USER CALIBRATES DEVICE BY VARYING ARM-LENGTH DISTANCE
218
OPTIMUM USER SETTING IS STORED

FIG. 2

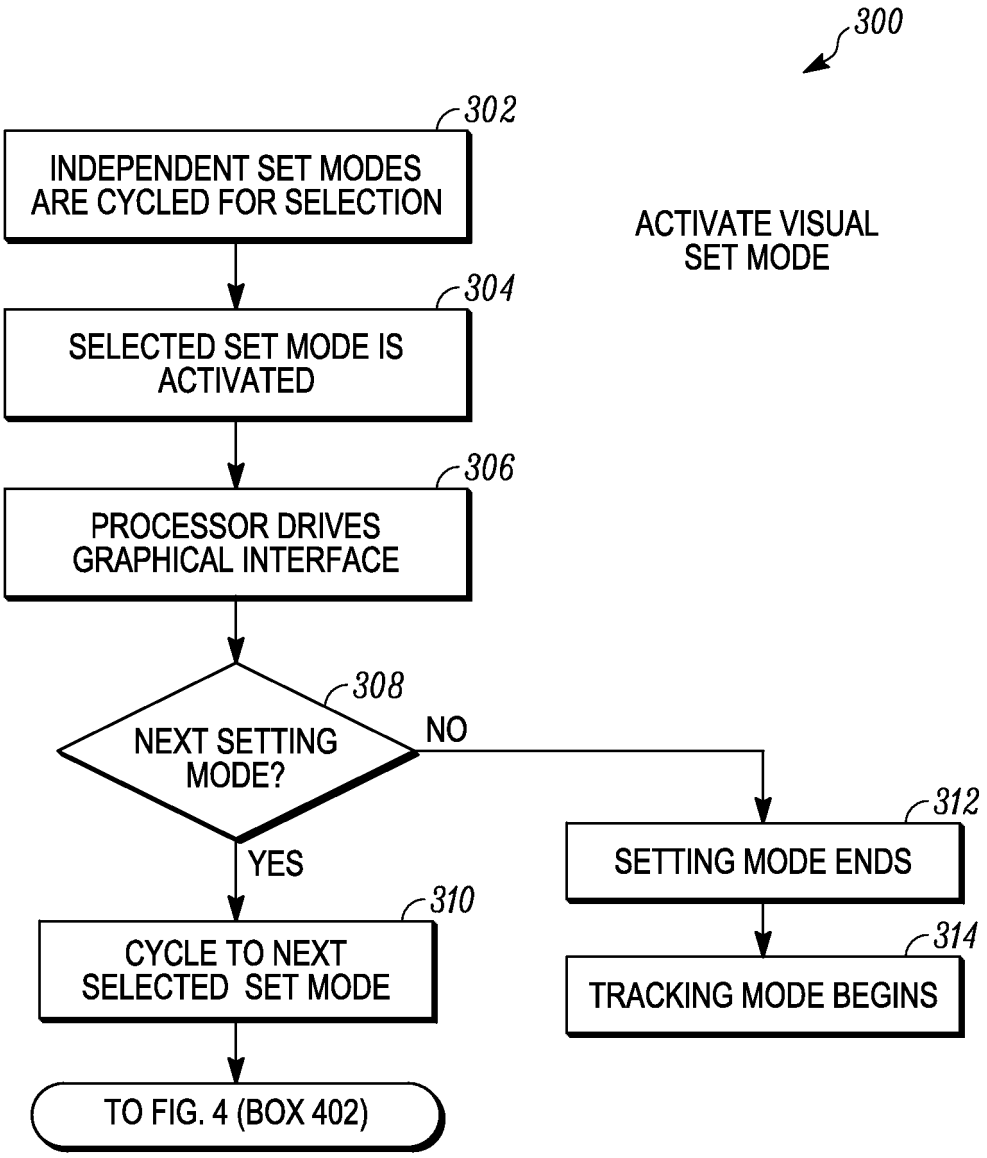

300
ACTIVATE VISUAL SET MODE
302
INDEPENDENT SET MODES ARE CYCLED FOR SELECTION
304
SELECTED SET MODE IS ACTIVATED
306
PROCESSOR DRIVES GRAPHICAL INTERFACE
308
NEXT SETTING MODE?
NO
YES
310
CYCLE TO NEXT SELECTED SET MODE
TO FIG. 4 (BOX 402)
312
SETTING MODE ENDS
314
TRACKING MODE BEGINS

FIG. 3

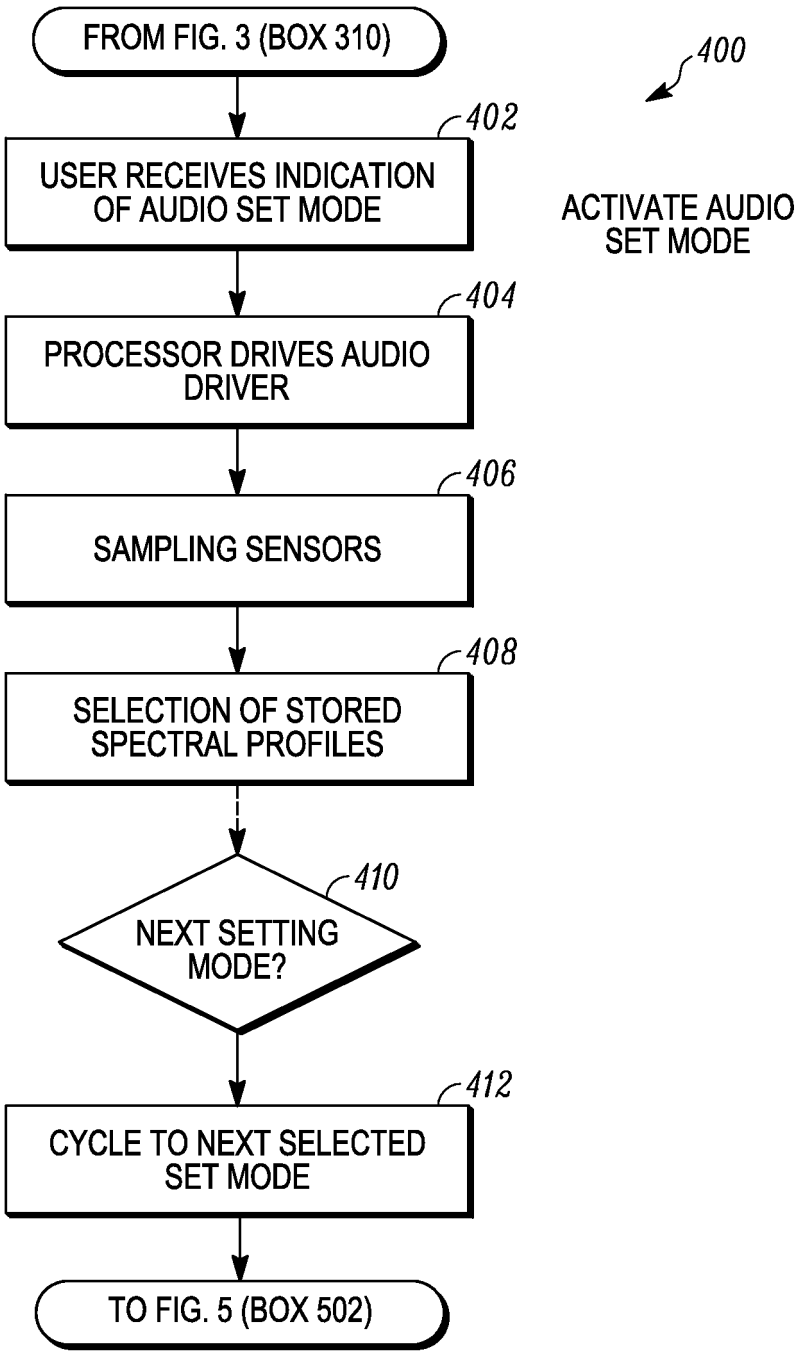

FROM FIG. 3 (BOX 310)
400
402
USER RECEIVES INDICATION OF AUDIO SET MODE
ACTIVATE AUDIO SET MODE
404
PROCESSOR DRIVES AUDIO DRIVER
406
SAMPLING SENSORS
408
SELECTION OF STORED SPECTRAL PROFILES
410
NEXT SETTING MODE?
412
CYCLE TO NEXT SELECTED SET MODE
TO FIG. 5 (BOX 502)

FIG. 4

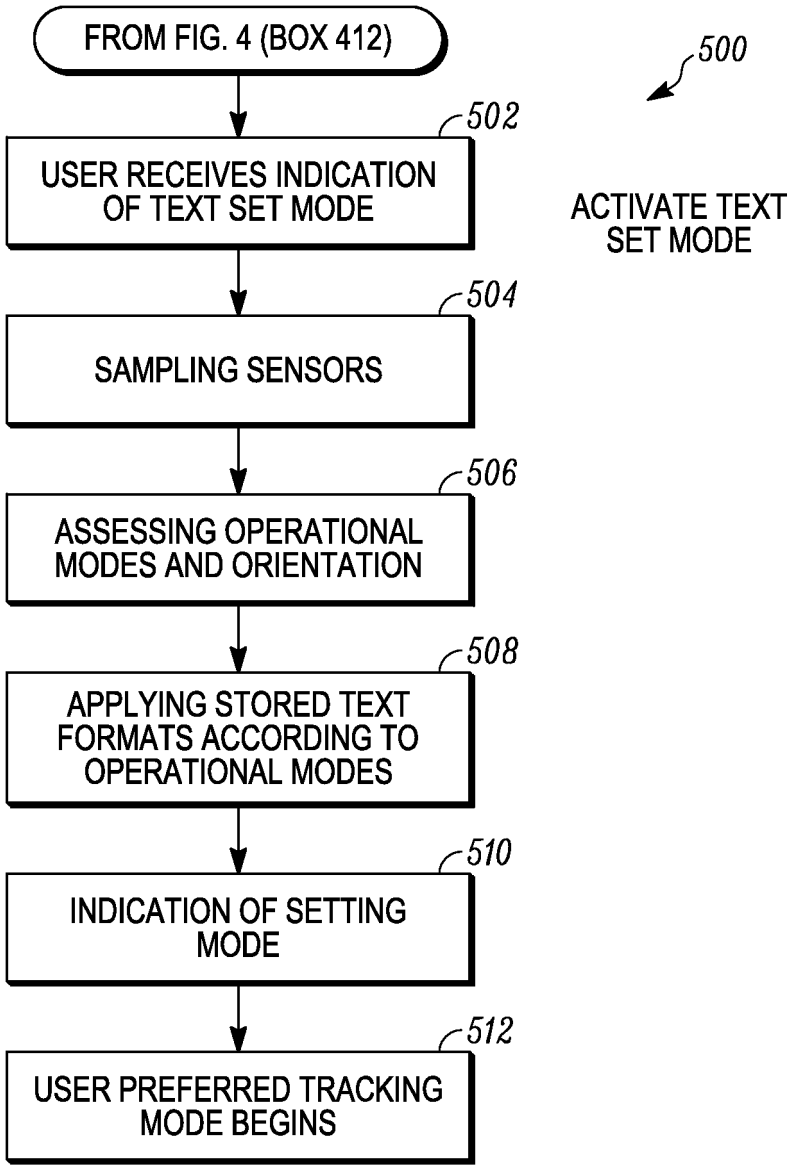

FROM FIG. 4 (BOX 412)
500
ACTIVATE TEXT SET MODE
502
USER RECEIVES INDICATION OF TEXT SET MODE
504
SAMPLING SENSORS
506
ASSESSING OPERATIONAL MODES AND ORIENTATION
508
APPLYING STORED TEXT FORMATS ACCORDING TO OPERATIONAL MODES
510
INDICATION OF SETTING MODE
512
USER PREFERRED TRACKING MODE BEGINS

FIG. 5

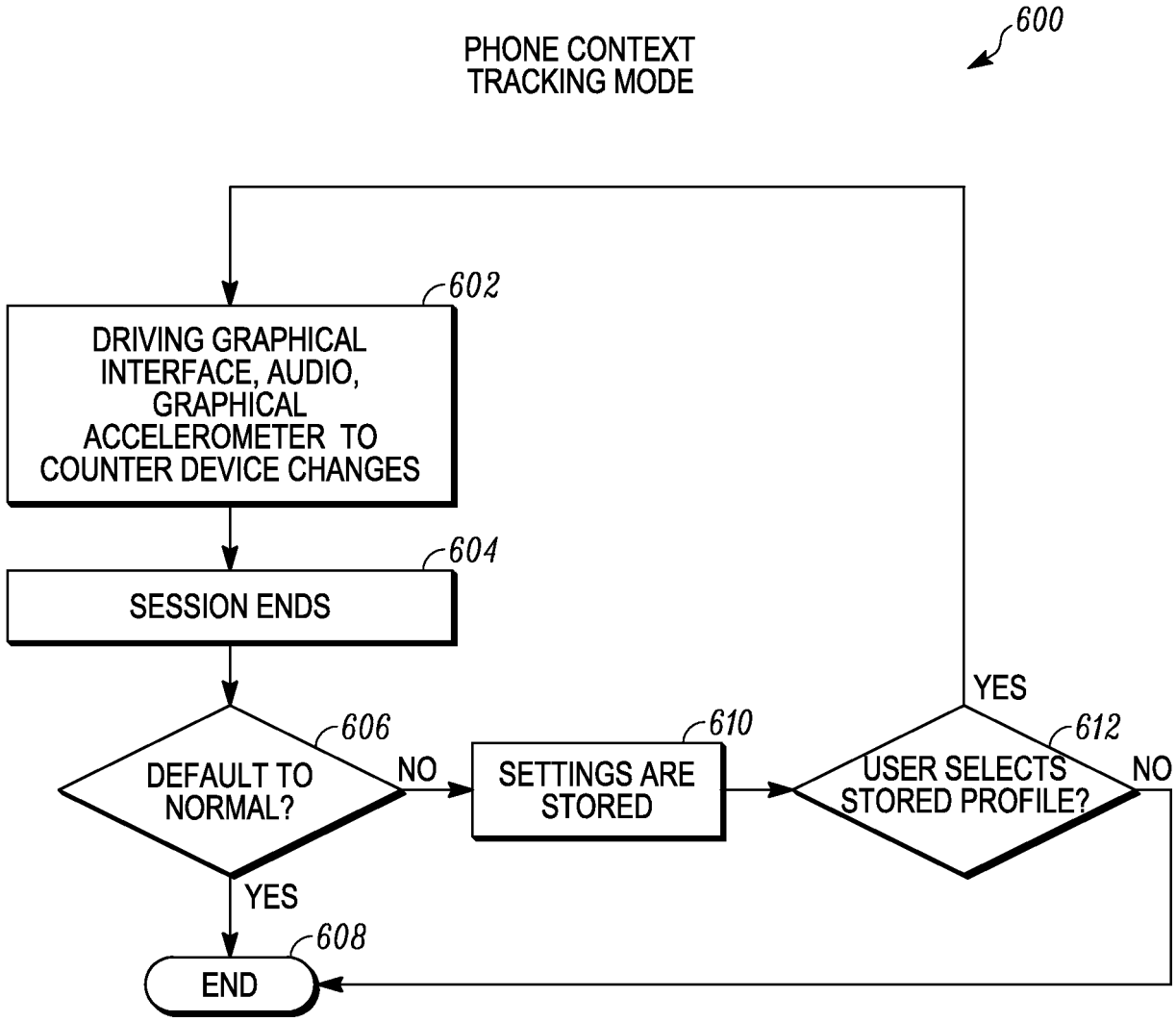

PHONE CONTEXT TRACKING MODE
600
602
DRIVING GRAPHICAL INTERFACE, AUDIO, GRAPHICAL ACCELEROMETER TO COUNTER DEVICE CHANGES
604
SESSION ENDS
606
DEFAULT TO NORMAL?
NO
610
SETTINGS ARE STORED
612
USER SELECTS STORED PROFILE?
YES
NO
YES
608
END

FIG. 6

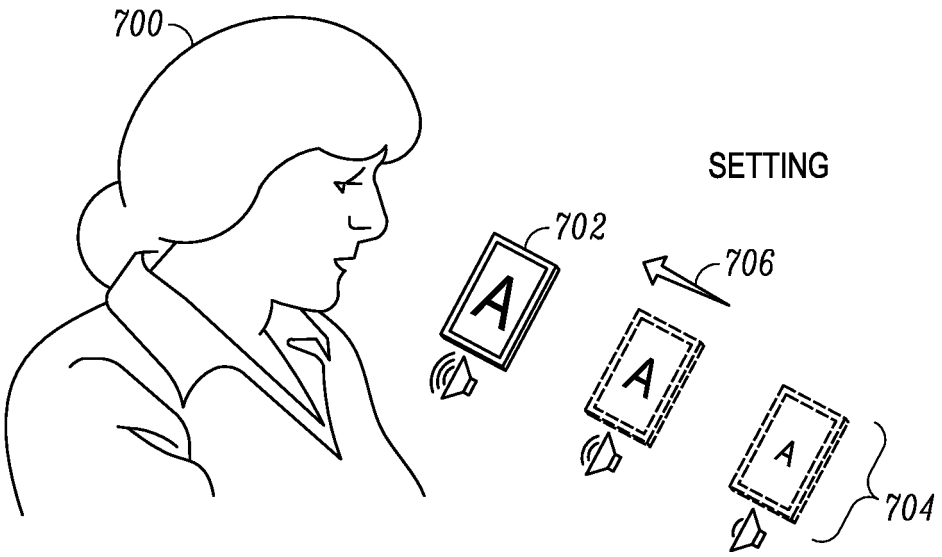


FIG. 7

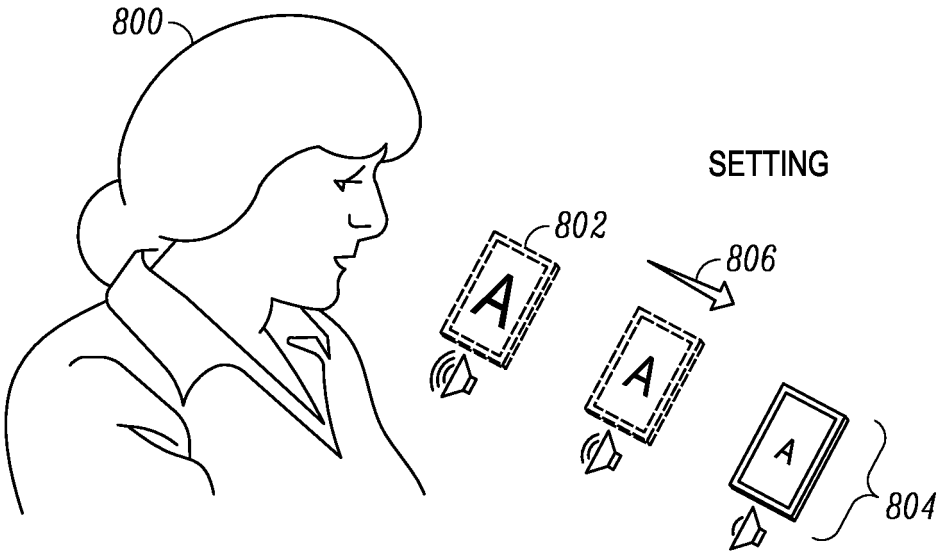


FIG. 8

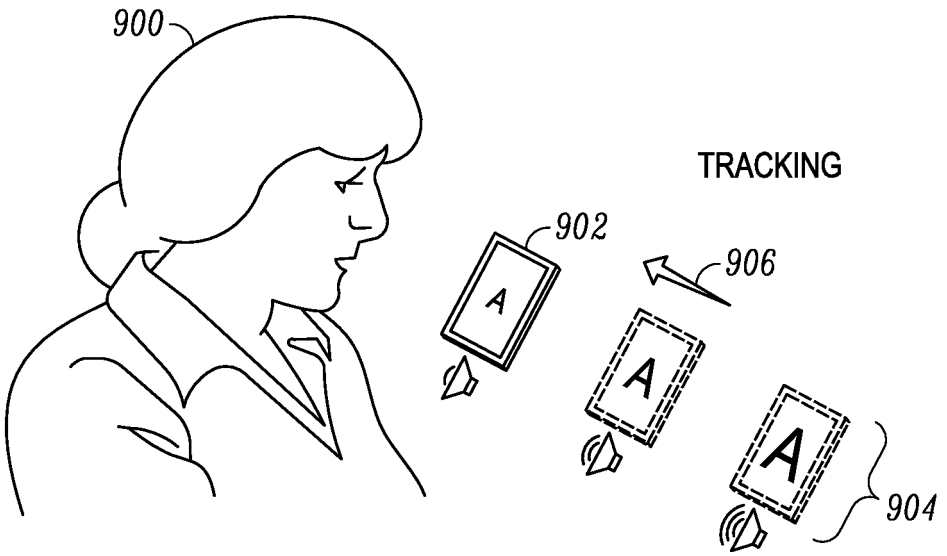

900
TRACKING
902
906
A
A
A
904

FIG. 9

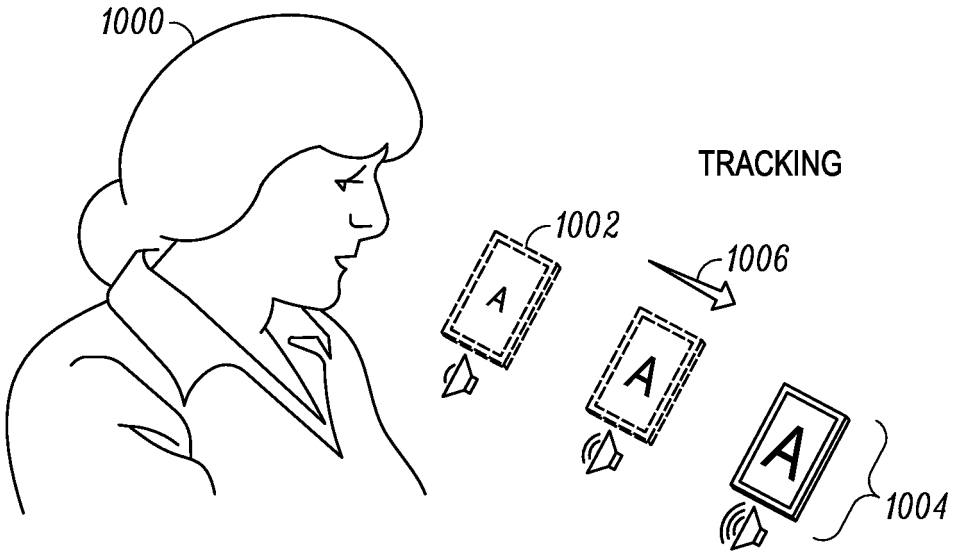

1000
TRACKING
1002
1006
A
A
A
1004

FIG. 10

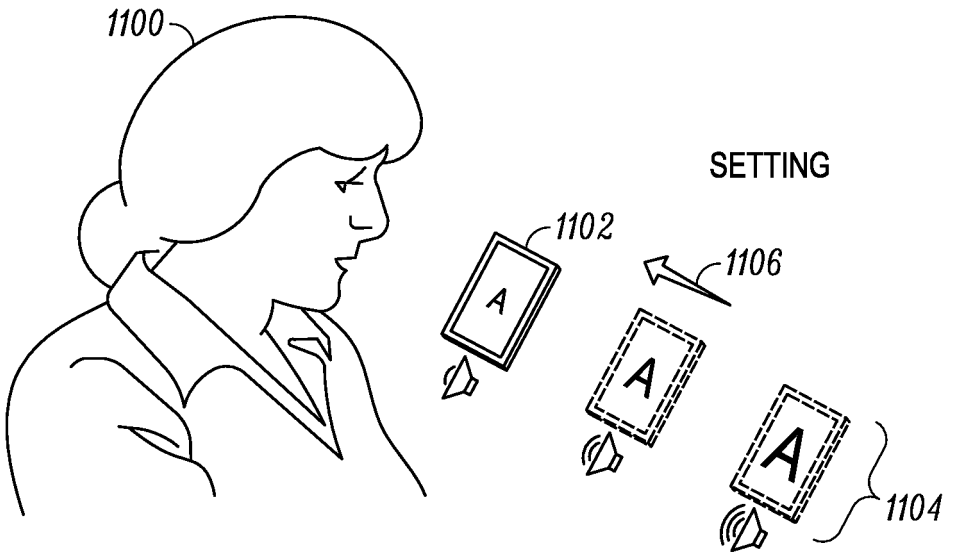

1100
SETTING
1102
1106
A
A
A
1104

FIG. 11

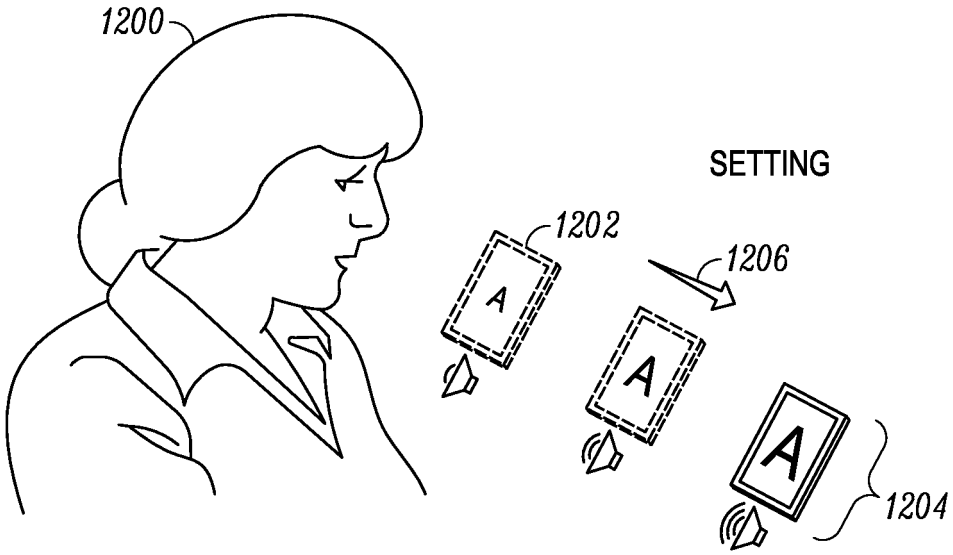

1200
SETTING
1202
1206
A
A
A
1204

FIG. 12

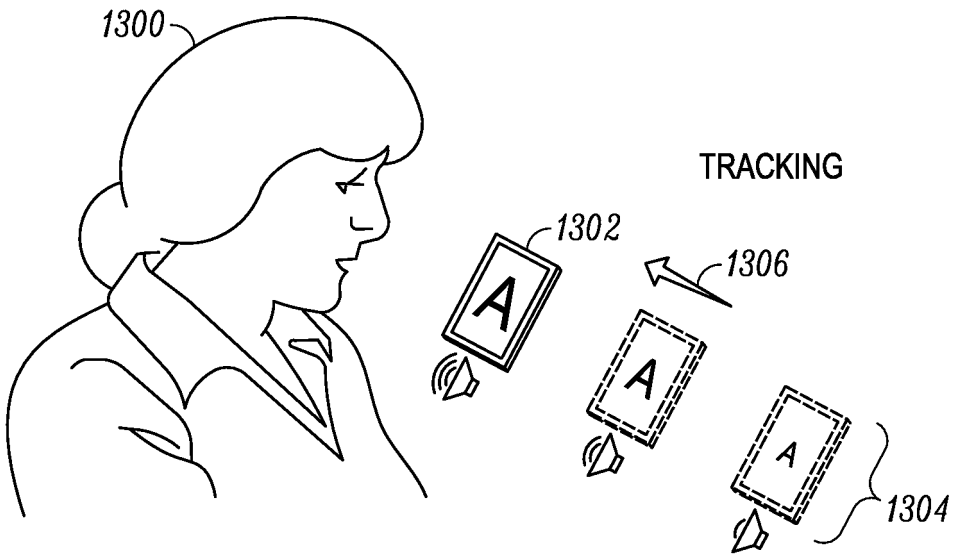

1300
TRACKING
1302
1306
A
A
A
1304

FIG. 13

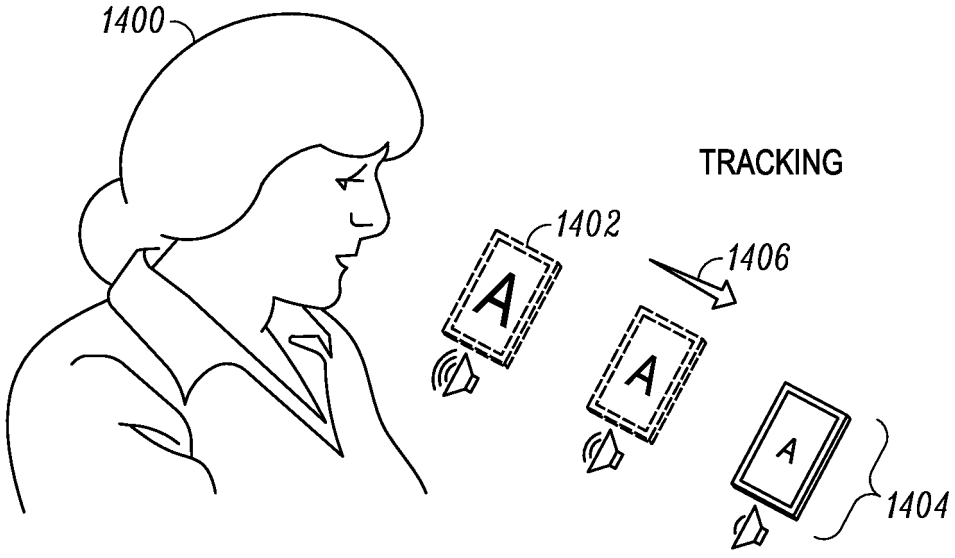

1400
TRACKING
1402
1406
A
A
A
1404

FIG. 14

REFERENCES CITED IN THE DESCRIPTION

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